

26
44
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(26) $2y = x^2 - xy$, $x=2$, $dx = -0.05$ $y=1$

$$\downarrow$$

$$2 \frac{dy}{dx} = 2x - x \cdot \frac{dy}{dx} - y$$

$$2 \frac{dy}{dx} + x \frac{dy}{dx} = 2x - y$$

$$\frac{dy}{dx} (2+x) = 2x - y$$

$$\frac{dy}{dx} = \frac{2x-y}{2+x}$$

$$dy = \frac{2x-y}{2+x} dx$$

$$2y = 2^2 - 2y$$

$$2y + 2y = 4$$

$$4y = 4$$

$$y = 1$$

$$dy = \frac{2(2) - 1}{2 + 2} (-0.05)$$

$$dy = \frac{3}{4} \left(-\frac{1}{20} \right) = \left(-\frac{3}{80} \right)$$

$$= -0.0375$$

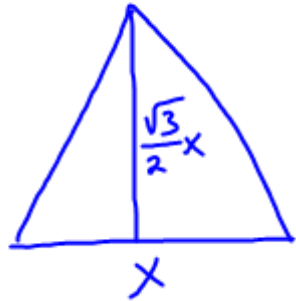
$$d(\sqrt{1-x^2}) \rightarrow f'(x) = (1-x^2)^{\frac{1}{2}}$$

$$= \frac{1}{2} \cdot \frac{1}{\sqrt{1-x^2}} \cdot -2x = -\frac{x}{\sqrt{1-x^2}}$$

$$dy = f'(x) dx$$

$$dy = -\frac{x}{\sqrt{1-x^2}} dx$$

(44)

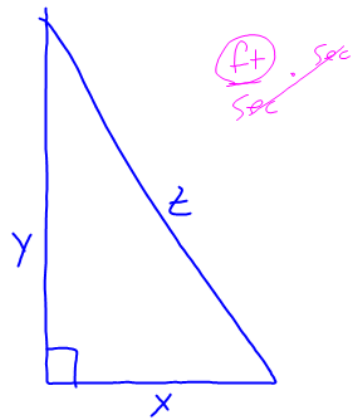


$$A = \frac{1}{2} \cdot x \cdot \frac{\sqrt{3}}{2}x = \frac{\sqrt{3}x^2}{4}$$

$$dy = \frac{2}{1} \cdot \frac{\sqrt{3}}{4}x \cdot dx = \frac{\sqrt{3}}{2}x dx$$

$$= \frac{\sqrt{3}}{2} (20)(0.5) = 8.7 \text{ cm}^2$$

$$2z \frac{\partial z}{\partial t} = 2x \frac{\partial x}{\partial t} + 2y \frac{\partial y}{\partial t}$$



$$x^2 + y^2 = z^2$$

$$x^2 + y^2 = z^2$$

$$2x \frac{dx}{dt} + 2y \frac{dy}{dt} = 2z \frac{dz}{dt}$$

$$\frac{dz}{dt} = \frac{2x \frac{dx}{dt} + 2y \frac{dy}{dt}}{2z}$$

$$\frac{dz}{dt} = \frac{2(200)(40) + 2(600)(-30)}{2(632.455)}$$

$$\frac{dz}{dt} = -15.81 \text{ ft/sec.}$$

$$x = 200$$

$$y = 600 \text{ at our moment}$$

$$z = 632.46$$

$$x = 240$$

$$y = 570$$

$$z = 618.46$$

at a little later moment

$$\frac{dz}{dt} = -\frac{14}{1 \text{ sec}}$$

$$x = 204$$

$$y = 597$$

$$z = 630.89$$

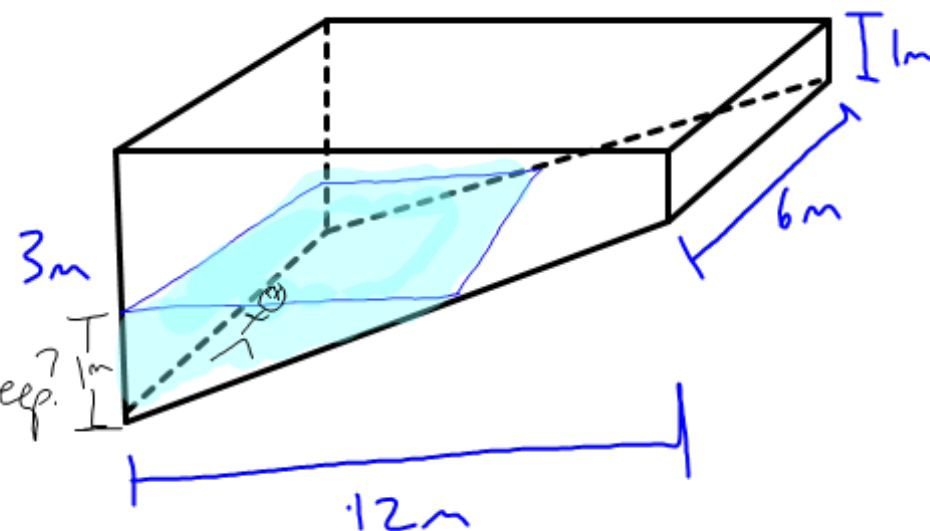
$$\frac{dz}{dt} = -\frac{1.56}{0.1} \approx -15.6$$

A Swimming pool is 12 meters long, 6m wide, 1 meter deep at the shallow end, and 3 meters deep at the deep end. Water is being pumped in at $\frac{1}{4}$ cubic meters per minute, and there is 1 meter of water at the deep end.

(a) What percent of the pool is filled?

(b) At what rate is the water level rising when it is 1 meter deep?

(c) check your solution.



HW

- Finish the pool problem

- 4.6 # 3, 6, 9, 11, 13, 17